

THE CARE OF PRINTS AND DRAWINGS WITH  
NOTES ON MATTING, FRAMING AND STORAGE

Restoration and Conservation Laboratory  
National Gallery of Canada  
Ottawa  
Revised January 1977

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Experience has shown that works of art on paper, when allowed to remain in contact with non-acid-free paper, deteriorate rapidly. It is therefore essential to use only the best possible acid-free cardboard for matting these works.

Unfortunately, most papers and cardboards manufactured today are acidic. The measure of acidity and its opposite state, alkalinity, which is expressed in terms of the presence of the hydrogen ion concentration called the pH reading, can be tested by various chemical methods. This pH is graded from 0 to 14. The section from 0 to 6 is a measure of acidity; that from 8 to 14 is a measure of alkalinity; 7 on this scale is, therefore, the neutral point. In the manufacture of paper and mat board, if care is taken in the careful selection of ingredients and in precise quality control, it is possible to produce a neutral paper with a pH measure of 7, known as acid-free. This ensures a stable product with long lasting qualities. Paper containing long fibres, such as cotton and linen, also contribute to its strength and endurance. Newsprint, made of short ground-up wood fibre is usually strongly acidic (giving a pH reading in the region of 4 to 5). For these reasons the life of newsprint is short (less than 10 years).

Low quality cardboards are also hazardous, especially as excessive moisture can cause dyes to be released from the board and penetrate to the work of art.

Several paper manufacturers now have acid-free mat boards available

Rec'd: Nov 30/79

Order No.:

Price: Gift

Acc. No: Christine LePalme, National  
Gallery of Canada.

37645

An acid-free all-rag matting board of high quality, made expressly to National Gallery of Canada specifications, is called HARUMI board. It can be purchased from:

Buntin Gillies and Company Limited

Attention: Mr. J.S. Crawford

2730 Lancaster Road

Ottawa, Ontario

Canada K1B 4S4

Telephone: Area Code 613 733-9006

<u>Colour</u>	<u>*Thickness</u>	<u>Sheet Dimensions</u>	<u>Sheets per Package</u>	<u>Per sheet Price**</u>
White	1 Ply	45 x 37 inches	25	\$3.04
Bright White	1 Ply	45 x 37 inches	25	\$3.07
Cream	1 Ply	45 x 37 inches	25	\$3.07
White	2 Ply	44 $\frac{1}{4}$ x 36 $\frac{1}{4}$ inches	15	\$6.90
Bright White	2 Ply	44 $\frac{1}{4}$ x 36 $\frac{1}{4}$ inches	15	\$6.96
Cream	2 Ply	44 $\frac{1}{4}$ x 36 $\frac{1}{4}$ inches	15	\$6.96

\* The term "ply" refers to thickness measured by a paper caliper. One ply would be a mat board of 32 caliper equal to  $\frac{32}{1000}$  of an inch (approximately 1mm). A two ply mat is 64 caliper equal to  $\frac{64}{1000}$  of an inch (approximately 2mm).

\*\* Prices at December 1976, include Federal Sales Tax, F.O.B. Ottawa. Minimum order is one package. Samples will be sent on request.



# I MATTING A WORK OF ART ON PAPER

- 1) The print or drawing should be hinged to the back sheet (as shown in fig 1) and not to the overthrow or "window" portion.
- 2) The work should be secured to the back sheet of the mat by T-hinges (as shown in fig 2). Use two hinges at the top edge, cut from Japanese tissue, affixed with starch paste (see description on page 16), as the adhesive. In this way the work is allowed to hang freely. Otherwise, wrinkles or cockling can result due to expansion or contraction of the work with changes in relative humidity. Gummed cloth 3/4 inch wide can be used for hinging very large works. Never use Scotch tape or masking tape which deteriorate, cause permanent discolouration and the tape cannot be removed safely if required later.
- 3) When it is necessary to display the full paper support on which the print or drawing is executed, the floating method is used to hold a work down in the overthrow mount. For this method the edges of the support are extended with strips of paper, preferably Japanese tissue, as follows:  
  
On the back of the work, along the edges, a thin layer of starch paste is applied about 2 to 3 mm wide, depending on the dimension of the sheet (fig 3). The strip of Japanese paper, approximately 4 to 5 cm wide, is carefully laid down onto the pasted area. After all four edges have been dealt with in this manner, the

sheet and attached strips are left to dry. Once totally dry, the work and the strips are slightly dampened, and then flattened, between sheets of blotting paper. The work is then secured to the back sheet of the mat with T-hinges (fig 3).

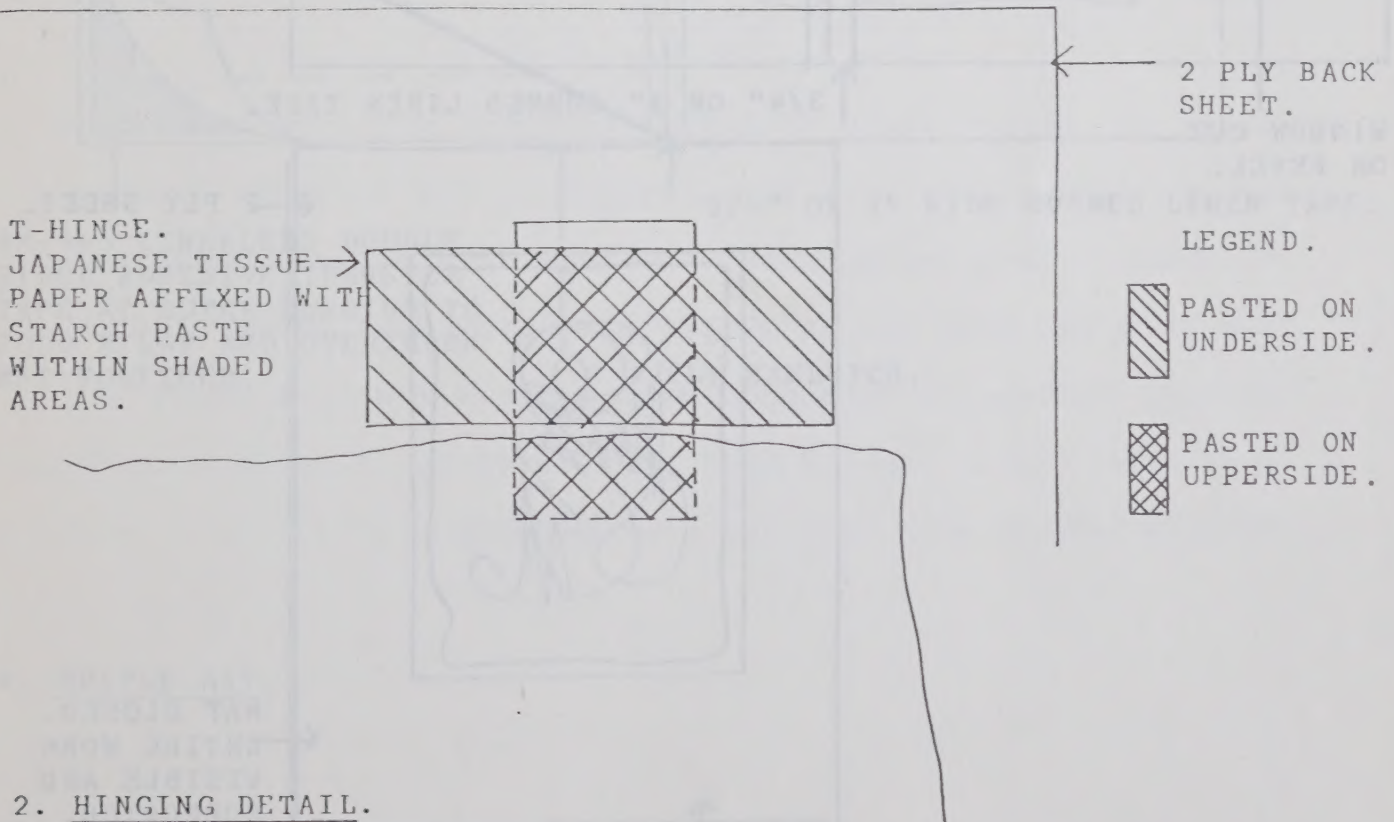
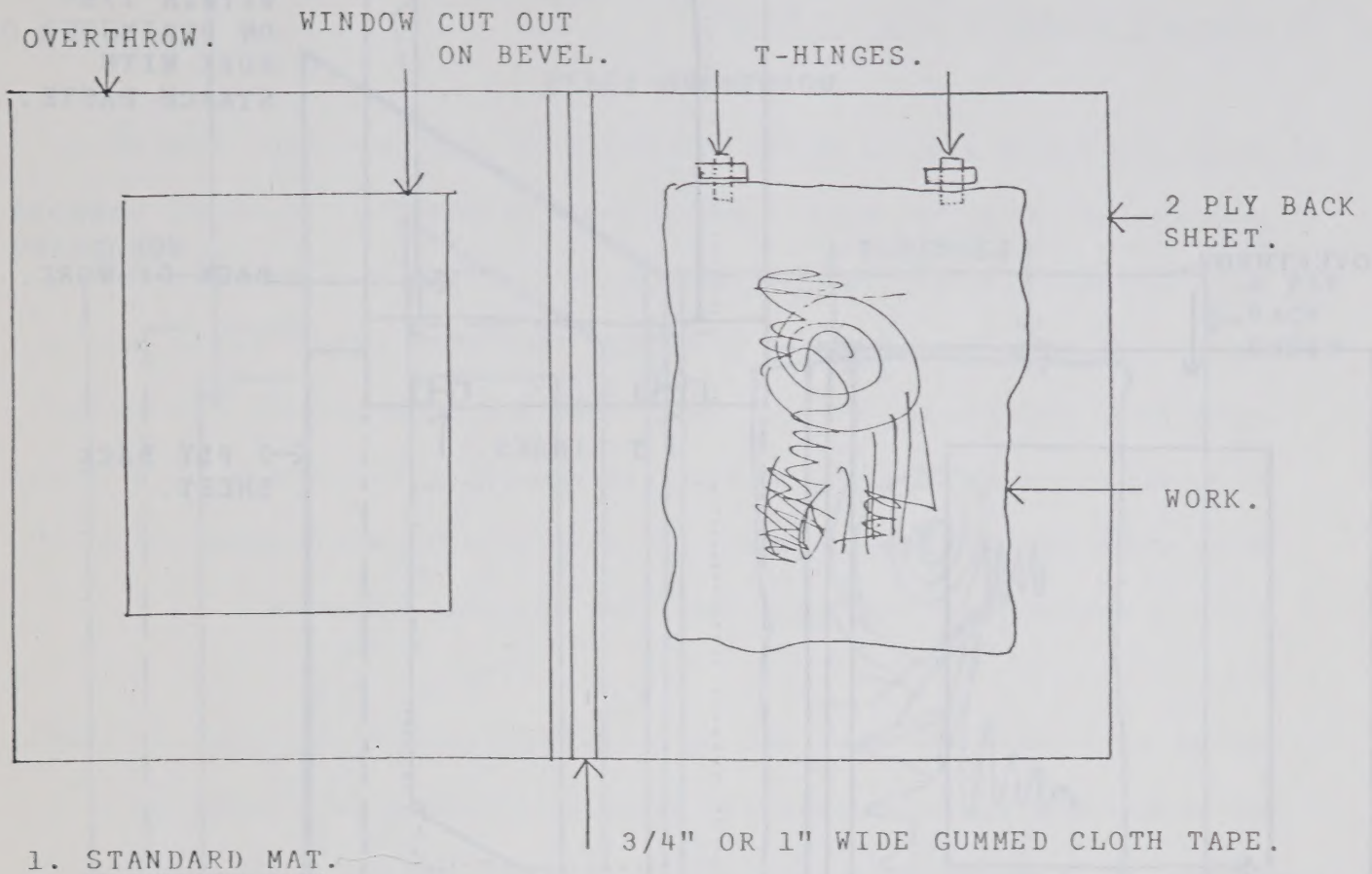
4) Dry-mount tissue must be avoided for hinging because a high temperature is required for its application, (dangerous to the work) and it is non-reversible.

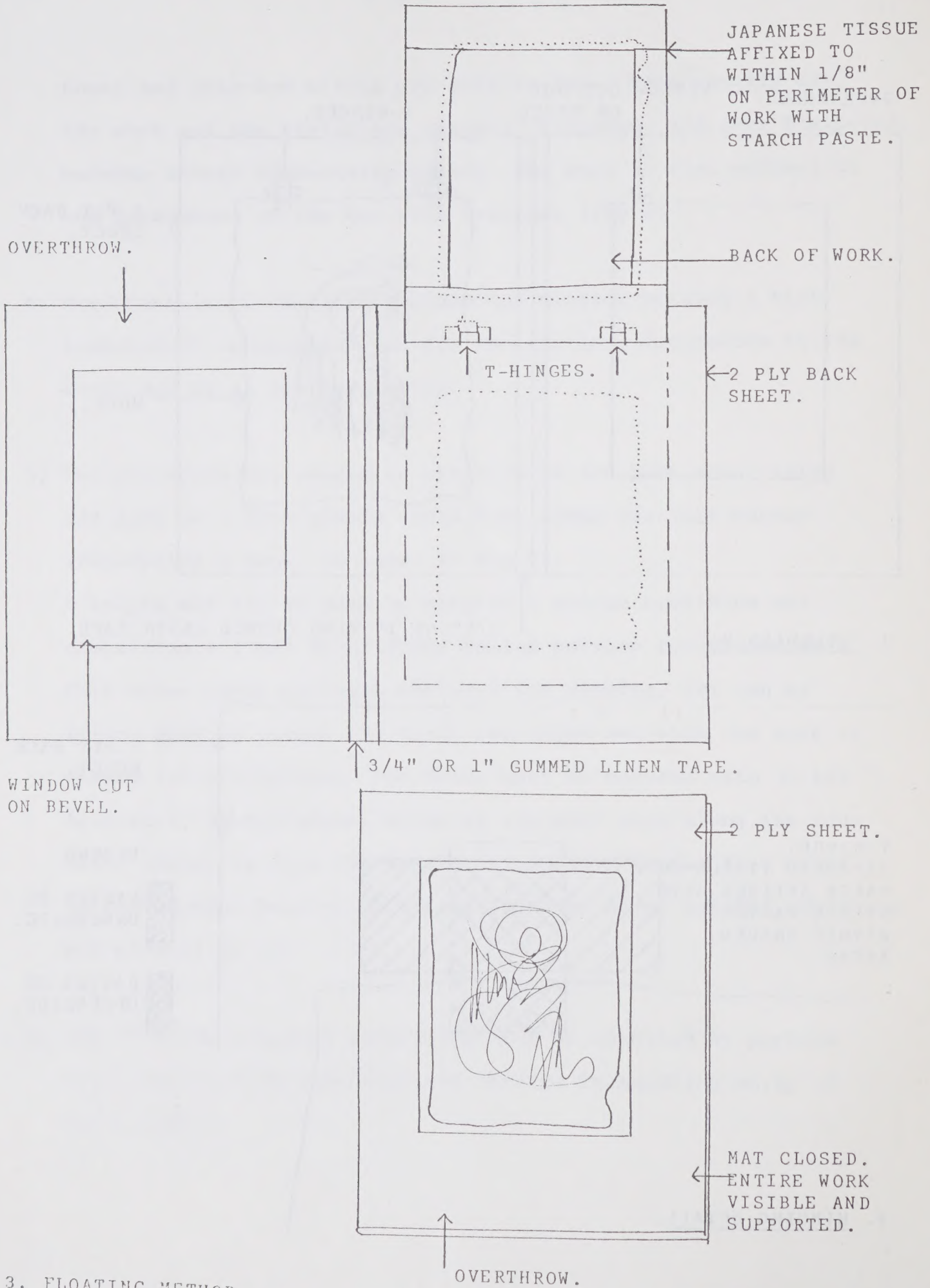
5) The overthrow mat should be attached to the back sheet using 3/4 inch or 1 inch gummed cloth tape along the left margin (resembling a book, as shown in fig 3).

A triple mat can be made by hinging a second overthrow mat containing a 5 mil Mylar sheet sealed between two window mats. This outer cover protects the work for viewing, yet can be folded back to reveal the first overthrow mat when the work is framed for exhibition. The Mylar must be secured with 3M 465 linerless, double-sided, adhesive transfer tape along the four outer edges, to form the sandwich (as shown in fig 4). Mylar is recommended because no plasticizers or other harmful additives are present in it.

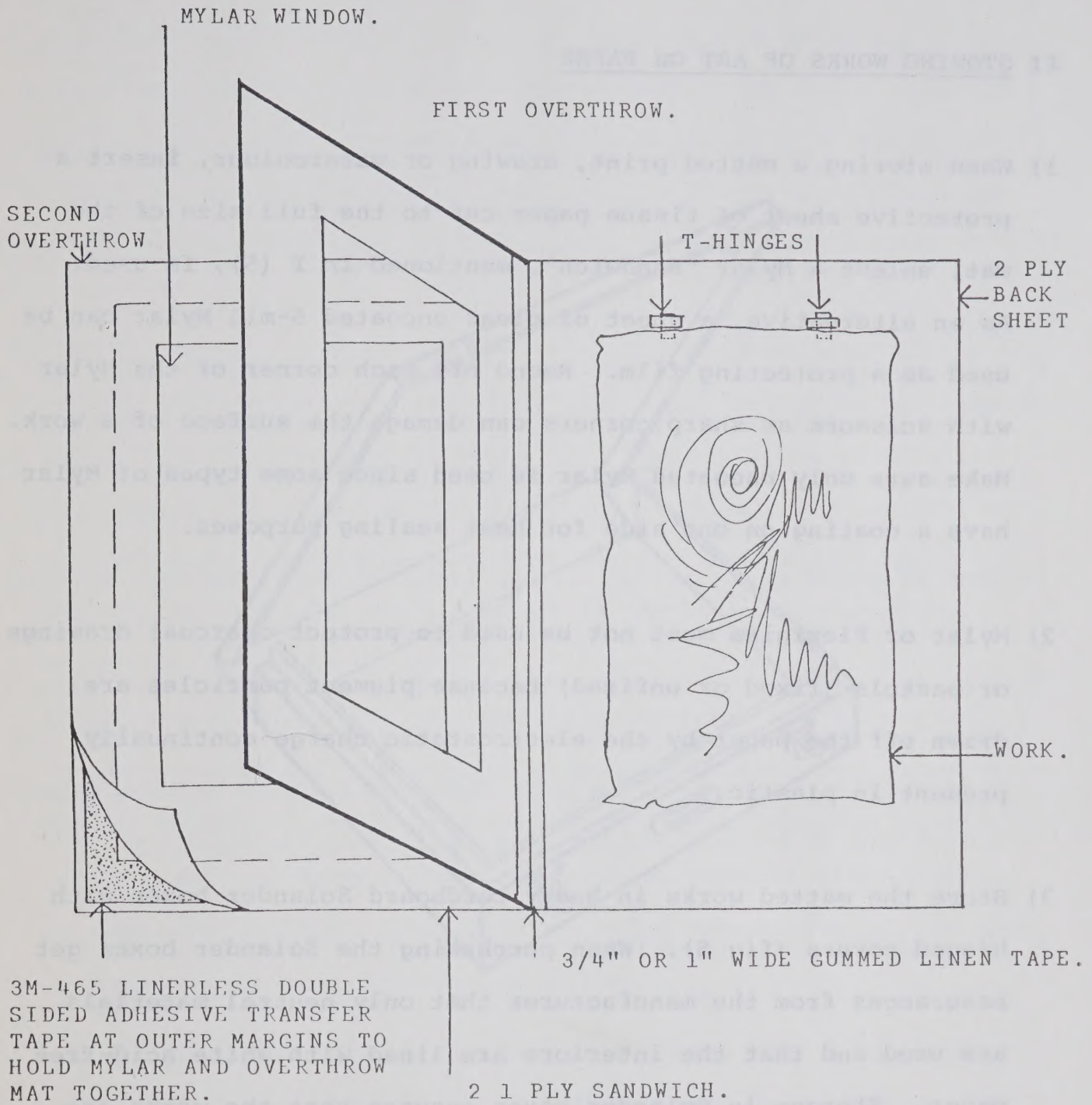
N.B. Any of these mounting techniques must be executed by persons with conservation knowledge and skilled in handling works of art on paper.









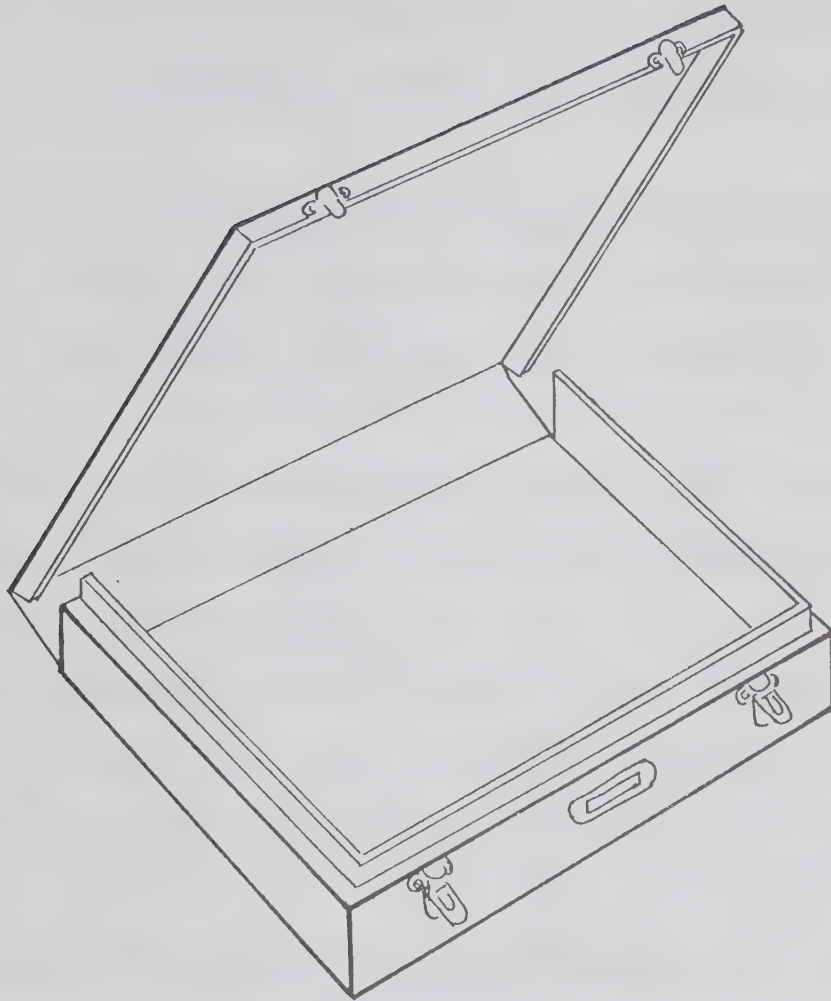


4. TRIPLE MAT.

## II STORING WORKS OF ART ON PAPER

- 1) When storing a matted print, drawing or watercolour, insert a protective sheet of tissue paper cut to the full size of the mat, unless a Mylar "sandwich", mentioned in I (5), is used. As an alternative, a sheet of clear uncoated 5-mil Mylar can be used as a protecting film. Round off each corner of the Mylar with scissors as sharp corners can damage the surface of a work. Make sure only uncoated Mylar is used since some types of Mylar have a coating on one side for heat sealing purposes.
- 2) Mylar or Plexiglas must not be used to protect charcoal drawings or pastels (fixed or unfixed) because pigment particles are drawn off the paper by the electrostatic charge continually present in plastic.
- 3) Store the matted works in heavy cardboard Solander boxes with hinged covers (fig 5). When purchasing the Solander boxes get assurances from the manufacturer that only neutral materials are used and that the interiors are lined with white acid-free paper. Storage in Solander boxes ensures that the works are kept from light, free of dust and scuffing. Acid-free cardboard folders can be used also for this purpose.





5. SOLANDER BOX.

### III FRAMING

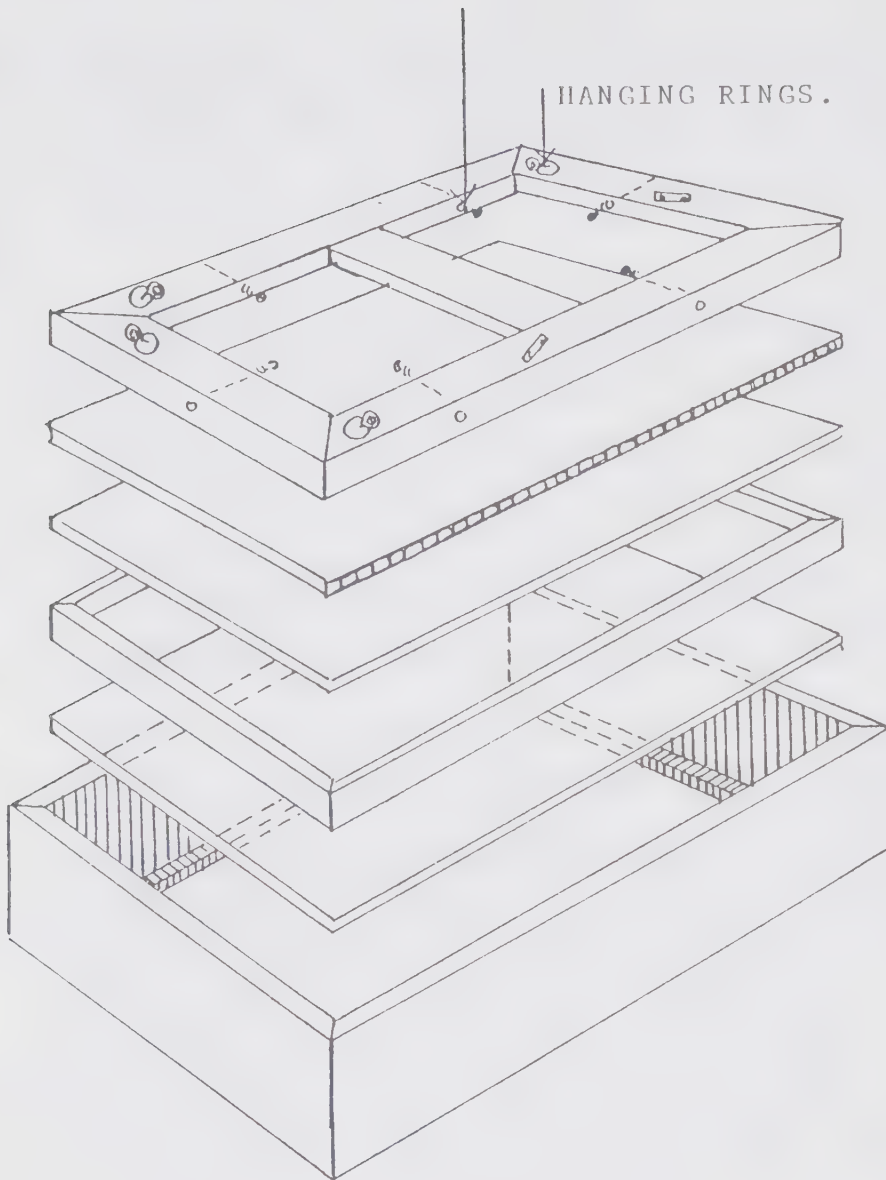
- 1) Frame matted works under ultraviolet-filtering Plexiglas which helps to reduce the deteriorating effects of ultra-violet rays although it does not eliminate them completely.
- 2) Ultraviolet-filtering Plexiglas, because of its electrostatic effect, as mentioned in II (2), must not be used over charcoal drawings or pastels. They should be framed under glass.
- 3) When shipping works of art framed under glass, make sure masking tape is placed over the glass in a grid pattern spaced not more than an inch apart horizontally and vertically. The tape will hold the glass in place, usually without damage to the work, if accidentally broken. (Plexiglas does not require masking tape nor should it be used, since it is difficult to remove).
- 4) Use a stiff, good quality cardboard back or fluted plastic backing sheets, as listed on page 20. Corrugated cardboard, plywood or a wood panel should never be used as a backing as discolouration of the mat or work by staining can occur.
- 5) Matted works having one dimension greater than 28 inches should not utilize metal frames for travelling. This type of frame is not sturdy enough to offer protection for larger works. Strong wood frames are recommended for larger sizes.



- 6) A four-element hardwood frame, designed at the National Gallery, (as illustrated in fig 6), is recommended. The frame consists of a plain, waxed birch-wood moulding with glass or Plexiglas sheet, a white Plexiglas spacer strip, fluted plastic backing and a birch-wood frame with retaining screws.
  
  - 7) Another method of framing, sometimes favoured because of its design, its uniformity and its flexibility in display arrangements, is to insert a drawing or print in a Plexiglas box or shell. The drawing or print is placed without hinging on an acid-free support and must have an overthrow mat or a Plexiglas spacer between the support and the cover to avoid contact with the Plexiglas (as shown in fig 7).
- High relative humidity can cause condensation and if the work is pressed against the Plexiglas surface without an overthrow mat or a spacer, there is danger of the work becoming permanently stuck to the surface. When this occurs, removal often results in permanent damage. Condensation, also can result in the loss or smearing of a water-soluble medium.

ROUNDHEAD FASTENING SCREWS.

HANGING RINGS.



← HARDWOOD RETAINING  
FRAME.

← FLUTED PLASTIC  
BACKING FRAME.

← MAT WITH WORK.

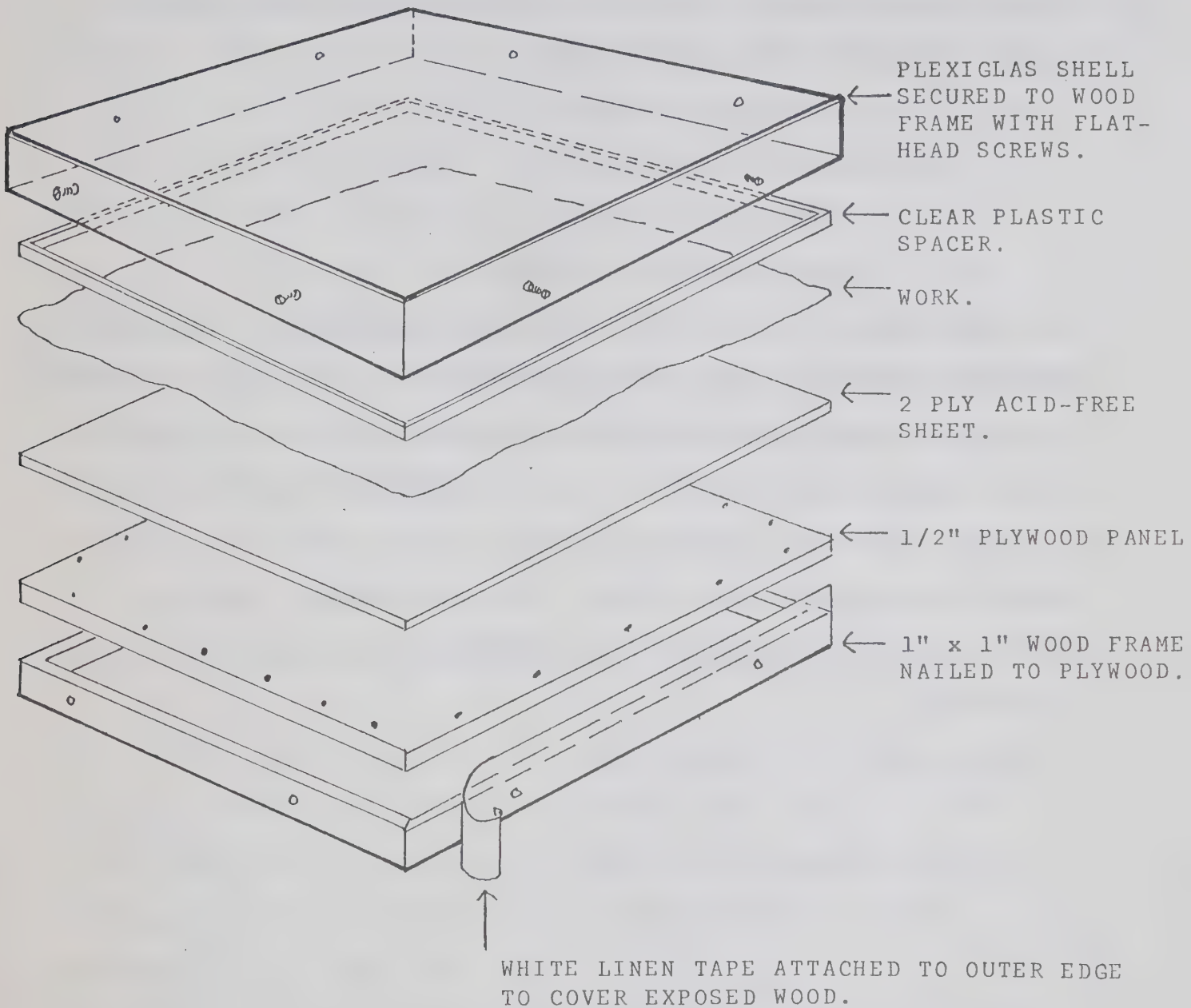
← WHITE PLEXIGLAS  
SPACER.

← GLASS OR PLEXIGLAS.

← HARDWOOD (BIRCH)  
FRAME.

6. FOUR-ELEMENT HARDWOOD FRAME.





7. CLOSE-UP FRAME (WITHOUT HINGES).

IV THE ADVANTAGES OF STANDARD DIMENSIONS FOR MATTING AND FRAMING

1) Works of art on paper in the National Gallery collections are matted in four standard dimensions:

Size one, 14 x 18 in.

Size two, 16 x 21½ in.

Size three, 22 x 28 in.

Size four, 28 x 36 in.

These dimensions are standard for prints and drawings departments throughout North America and in England (with occasional deviation in size 2). These matted works are stored in Solander boxes or folders, which are made to conform to these four dimensions. Re-usable frames can accommodate these matted works and can be shipped in re-usable slot crates. Oversized works requiring special mats are usually kept permanently framed for safe handling and storage.



## V WORKSHOP NOTES

- 1) The working areas for preparing and framing matted works should always be clean, dust-free and uncluttered. Unmatted works of art must be protected during the process within a tissue paper folder and cardboard sheets to prevent accidental damage. In the workroom use only pencils. Avoid ball point pens since their ink stains cannot be removed. Ultra-violet filtering sleeves must be installed in fluorescent fixtures. In areas where works of art are on display, light levels should not exceed 50 lux and must be incandescent lighting only. Remember No Smoking in the work room.

## References

- 1) F.W. Dolloff and R.L. Perkinson: How to care for Works of Art on Paper. Museum of Fine Arts, Boston, Mass., 1971 (\$1.50).
- 2) C. Zigrosser and C.M. Gaehde: A Guide to Collecting and Care of Original Prints. The Print Council of America, Crown Publishers, Inc., New York, 1965.
- 3) H.J. Plenderleith: The Conservation of Antiquities and Works of Art. Oxford University Press, London. Second Edition 1971, pp 76-99.

## VI PREPARATION OF RICE OR WHEAT STARCH PASTE

Rice (or wheat) starch	100 grams
Water (deionized or distilled)	750 millilitres
Methyl cellulose solution	100 millilitres
Thymol	5 millilitres

Directions: Soak the starch overnight. Cook starch in double boiler stirring to prevent lumps until paste thickens and remains at same consistency and allow to cool. Add methyl cellulose solution stirring well. Then add the thymol.

Methyl Cellulose: Dissolve 3 grams of methyl cellulose powder in 100 millilitres of water, soak overnight then stir well. (methyl cellulose can be obtained from Talas or Fisher Scientific).

Thymol: Add thymol crystals to ethyl (or methyl) alcohol until solution is saturated. (Thymol is available at Drug Stores or Fisher Scientific).

To ensure sterile rice (or wheat) starch paste the following precautions are advisable:

1) Sterilize storage bottles and lids as follows:

a) boil (submerged in water) 15 minutes

or

b) place in oven at 300<sup>O</sup>F for 1/2 hour

2) Store the paste in sterilized covered bottles in a refrigerator

3) Remove paste from the bottle using a sterilized spoon.

Sterilize it in the same way as the bottles or wipe with ethyl alcohol.

4) Do not put back in the bottles any unused paste.

N.B. Thymol is toxic and should not be inhaled or allowed to touch the skin.



## VII ENVIRONMENTAL CONDITIONS

The following are the desired conditions of TEMPERATURE, RELATIVE HUMIDITY and LIGHTING which the National Gallery of Canada strives to maintain in all areas where its art objects are exhibited and stored.

Relative Humidity (RH): 50% plus or minus 5%

Temperature: 70°F plus or minus 2°F (21°C plus or minus 1°C)

Lighting: Tungsten lamps only are used for the artificial lighting of art objects. The use of fluorescent lamps is avoided, and sunlight is not permitted to strike objects in the galleries.

Intensity: a) not more than 300 lux for objects insensitive to light (metal, stone).

b) not more 150 lux for most objects including oil and tempera paintings.

c) not more than 50 lux for specially sensitive objects (watercolours, textiles, tapestries).

(For convenience, 10 lux is taken to equal 1 foot candle).

Light readings are obtained by measuring with a suitable light meter (see page 20) the light reflected from a clean white card placed near the surface of the art object.

# VIII MATERIALS AND SUPPLIES

## Cloth Gummed Tape for Hinging

$\frac{1}{2}$ ,  $\frac{3}{4}$ , 1 inch widths in 150 yard rolls

\* Nashua Canada Limited  
Coated Products Division  
P.O. Box No. 299  
Peterborough, Ontario

OR

from  $\frac{3}{4}$  inch and wider

Buntin Gillies & Co. Ltd.  
2730 Lancaster Road  
Ottawa, Ontario  
K1B 4S4

## Japanese Paper, Methyl Cellulose and Other Useful Material

Talas  
Division of Technical Library Service  
104 Fifth Avenue  
New York, New York 10011  
USA

## Thymol Crystals and Methyl Cellulose

Fisher Scientific Co. Ltd.  
(In major cities in Canada)

## Mylar

5 mil, type D, super clear, uncoated

Dupont of Canada Ltd.  
Films Department  
P.O. Box 660  
Montreal, Quebec

\*Recent tests have shown that this tape becomes more acidic with age and that the adhesive is subject to discoloration. It does, however, remains the most acceptable of commercially available products.



Interleaving tissue paper

Process Materials Corporation  
329 Veterans Boulevard  
CARLSTADT, New Jersey 07072  
USA

3M 465 linerless adhesive transfer tape

Stationery Stores

OR

3M Canada Ltd.  
P.O. Box 757  
London, Ontario

Solander Boxes for Storage

Perry Coodin  
264 Holmwood Avenue  
Ottawa, Ontario  
K1S 2P9.  
Telephone: 613 235-0131

OR

Spink & Gaborc Inc.  
26 East 13th Street  
New York, New York 10003  
USA

Acid-Free Folders and Envelopes for Storage

The Hollinger Corporation  
3810 South Four Mile Run Drive  
ARLINGTON, Virginia 22206  
USA

Ultra-Violet Filtering Plexiglas UF 1, 1/8 inch thick

Canus Equipment Limited  
340 Gladstone Avenue  
Ottawa, Ontario  
Telephone: 613 232-2657

Anti-Static Cleaner for Plexiglas  
"Rez-N Clean", \$6.00 per gallon can

Plastics of Ottawa  
216 Pretoria Avenue  
Ottawa, Ontario  
Telephone: 613 235-1465

Fluted Plastic Backing Sheets used in framing  
Sheets 48 x 60 inches, \$3.50 per sheet

Artistic Woodwork Co. Limited  
991 St. Vital Blvd.  
Montreal 459, Quebec  
(Also in Toronto and Vancouver)

Ultra-Violet Filtering Sleeves for Fluorescent Tubes  
Comco Filter-Ray Sleeves in lengths 48 and 96 inches

Commercial Plastics and Supply Corporation  
1127 Newmarket Street  
Ottawa, Ontario  
K1B 4N4  
Telephone: 613 745-7043

Illumination measuring instrument  
Gossen Panlux meter Model N.

Photoquip Systems Ltd.  
1018 Wellington St.  
Ottawa, Ontario  
Telephone: 613 725-3368

Price: \$198.00

Temperature and Relative Humidity Recorders

Belfort Hygrothermograph Model 5-594-2. One month chart.  
Battery operated drive. Chart No. 15677 (Range -12°C. to  
43°C. and 0% to 100% RH).

Carleton Instrument Ltd.  
2414 Holly Lane,  
Ottawa K1V 7P1  
Telephone: 613 731-4703

Price: \$380.00

(ALL PRICES QUOTED ARE APPROXIMATE)



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